

ZOOLOGY—*Millipeds collected enroute from Florida to San Antonio, Texas, and vicinity.* H. F. Loomis, Miami, Fla.

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In the latter half of December 1958, the writer and his wife visited San Antonio, Tex., spending some time collecting millipeds on the way and in the region about San Antonio. One day was devoted to searching the Kerrville area in the hope of rediscovering several of the more unusual species described from there by Prof. R. V. Chamberlin alone or in conjunction with Stanley Mulaik, and some success was had. The collection as a whole resulted in the finding of five new species, one of which represents a new genus, and in establishing further localities for several known species. Descriptions and data on these are here presented as well as descriptions of three other new species received following our return to Florida. Unless otherwise stated all collections reported were made by E. M. and H. F. Loomis.

Type specimens of all species described are deposited in the U. S. National Museum.

Family DESMONIDAE

Genus **Desmonus** Cook

Desmonus Cook, Proc. U. S. Nat. Mus. **21**: 463. 1898.

Ethocyclus Chamberlin and Mulaik, Journ. New York Ent. Soc. **49**: 58. 1941.

Specimens of this genus from five localities within a radius of approximately 100 miles of San Antonio present several interesting features. None of these millipeds appear to have been described as belonging to this genus, and all have certain characters in common that probably are generic but may be only specific; a question that can not be determined with any degree of satisfaction without additional and more widely collected material. From experience in making the present collection this should become available upon proper search.

The discovery of *Desmonus* between Bandera and Helotes came during the return from Kerr County to find additional specimens of species collected there by Mr. and Mrs. Stanley Mulaik and described in the paper by him and Professor Chamberlin (loc. cit.). It had been hoped to obtain specimens of *Ethocyclus atophus*, but no

cyclodesmids were found. However, with the finding of the *Desmonus* and subsequent specimens in the region a careful reexamination of the description of *Ethocyclus* forced the conclusion that it is a desmonid rather than a cyclodesmid.

While the first three segments are of quite similar shape in the Cyclodesmidae and Desmonidae, the fourth segment in *Ethocyclus* is described as laterally broader and less acute than the fifth segment, a normal condition for the latter family but applying in only the smaller of the two genera of the former. The first segment of *Ethocyclus* is said to bear two transverse rows of setae and "on typical segments the posterior portion of tergite elevated above level of anterior portion and divided into low tubercular swellings which appear to have born(e) setae forming a transverse series." These are characters of *Desmonus* attributed to no other cyclodesmid than *Ethocyclus*, and hence the latter genus is placed as a synonym of the former.

The Texas specimens, representing three species, are in the group having 20 segments; all are essentially white in color but have a coating of organic matter; pits are at the anterior junction of carinae and dorsum of segments 3 through 20; head with a definite low ridge beginning between the antennae and extending upward halfway to segment 1, where it terminates and is succeeded by an impressed sulcus across the vertex; segments 1 to 4 with two transverse series of short, well-separated setae which are reduced to a single series on ensuing segments; segment 4 with outer margin of lateral keels elongate, sometimes slightly rounded, in shape intermediate between the keels of segments 8 and 9; dorsal tubercles usually beginning on segment 5 and continuous through segment 19 but lacking or very indefinite on segment 20; males with lateral keels of segments 5 to 15 at least, more oblique than those of female, the dorsal tubercles also more prominent.

In the accompanying descriptions and illustrations it will be seen that the three species are very closely related and a wider range of specimens may show that one or two of them will have to be reduced in rank. The dorsal tubercu-

lation varies greatly in amount in specimens within the species but seems to be typical for each of them. None of the specimens of *distinctus* has the tubercles of segment 19 coalesced to form two enlarged swellings as occur in the other two species, and *conjunctus* does not have the tubercles of the midbody segments as high or inclined as in *crassus* but does have those of segment 19 larger than on preceding segments. Differences of the gonopods are slight between the species, as Dr. Causey has observed¹ for the other species in a recent paper on the family, while within the present species considerable variation has been noted. For none of the previously described species has mention been made of the distinct cephalic ridge, which may be a feature limited to the new forms.

***Desmonus conjunctus*, n. sp.**

Male type and female from between Bandera and Helotes, Tex., December 26, 1958, co-collector J. C. Loomis; a male and 3 females from Landa Park, New Braunfels, and 2 males from Lake Placid, between New Braunfels and Seguin, Tex., December 29, 1958.

Description.—Largest specimen, a female, 9 mm long and 1.7 mm wide. Dorsal swellings or tubercles usually first evident on segment 6, rarely on segment 5, and increasing slightly in prominence thereafter, becoming strongest on segments 17, 18, and 19, on the latter of which the three innermost tubercles on each side are united into a single large rounded boss surmounted by the three setae of the individual tubercles (Fig. 1). In an extreme variant in sculpturing the male from New Braunfels shows much more prominent tubercles than any other specimen, and on segments 17 and 18 the three innermost ones on each side are united as on segment 19. In none of the specimens are any lateral tubercles evident below the compound

ones on segment 19. Last segment without tubercles. Gonopods as shown in Figs. 2 and 3.

***Desmonus crassus*, n. sp.**

Five males (1 the type) and 8 females from Victoria County, Tex., labeled "S-06 J. D. Mitchell" sent me for examination by Richard L. Hoffman from the National Museum collection.

Description.—This is a stouter species than either of the other two described here, attaining a length of 8 mm and a diameter of 1.9 to 2 mm. Tubercles generally more prominent than in the other two species, beginning on segment 5, where frequently they are quite distinct, and increasing in size thereafter and on the most strongly sculptured specimens they are considerably raised, inclined caudad, with setiferous apex devoid of coating and shining; segments 18, 19, and sometimes 17 with the three inner tubercles on each side united into a single large inclined tubercle with that on segment 19 smaller than that on 18; segments 18 and 19 without other lateral tubercles.

Gonopods with anterior arm showing two or three teeth, the posterior arm more slender at apex than in the other species (Fig. 4).

***Desmonus distinctus*, n. sp.**

Five males (1 the type) and 5 females "collected under rocks and logs in closely grazed pasture land with a few oaks and cedars on the Beauregard Road about 5 miles SSW. of Boerne, Tex., January 31, 1959," by J. C. Loomis.

Description.—Largest specimen, a female, 8.5 mm long and 1.5 mm in diameter. In general the tubercles are more prominent than those of *conjunctus* but less so than in *crassus*, although in one or two females the tubercles are not individually indicated except by the location of the setae; the males, however, have tubercles beginning on segment 5, becoming stronger thereafter and quite uniform in size from seg-

¹ Proc. Biol. Soc. Washington **71**: 173-78. 1958.

FIGS. 1-23.—1-3, *Desmonus conjunctus*, n. sp.: 1, segments 19 and 20 of male, posterior view; 2, right gonopod, lateral view; 3, apex of left gonopod of Landa Park male, lateral view. 4, *Desmonus crassus*, n. sp., left gonopod, lateral view. 5, *Desmonus distinctus*, n. sp., apex of right gonopod, lateral view. 6, 7, *Ilyma digitata*, n. sp.: 6, right gonopod, lateral view; 7, apex of right gonopod, lateral view. 8, *Pseudopolydesmus bidens*, n. sp.: left gonopod, mesal view. 9, *Pseudopolydesmus minor* (Bollman): right gonopod, mesal view. 10-14, *Mecistopus varicornis*, n. sp.: 10, joints 6 and 7 of female antenna; 11, joints 6 and 7 of male antenna; 12, right anterior gonopod, lateral view; 13, ninth male legs, posterior view; 14, basal joints of tenth male legs, anterior view. 15-18, *Aniulus vestigialis*, n. sp.: 15, left mandibular stipe of male; 16, left anterior gonopod, lateral view; 17, left posterior gonopod, mesal view; 18, left posterior gonopod, caudolateral view. 19-23, *Ziniulus ambiguus*, n. sp.: 19, stipe and first two segments of male, lateral view; 20, right anterior gonopod, lateral view; 21, right posterior gonopod, lateral view; 22, apex of right posterior gonopod, caudal view; 23, apex of uncate blade of same gonopod, mesal view.



FIGS. 1-23.—(See opposite page for legend).

ment 7 to 17, although not so high or sharply marked as in *crassus*, those on segment 18 slightly larger, but only the second from within larger on segment 19, which has 2 to 5 distinct tubercles on each side with none coalesced as in the other species. Last segment with two very low, indefinite tubercles sometimes present.

Gonopods as shown in Fig. 5.

Desmonus atophus (Chamberlin and Mulaik)

In order to allow absolute verification of its family and generic position and its relationship to the species here described, a specimen of *atophus* was requested of Professor Chamberlin, but word has been received that he was unable to find the original material; hence, these matters await finding of the lost specimens or collections from the type locality, presumably Raven Ranch, although only Kerr County was so designated.

A NEW NAME IN CYCLODESMIDAE

In studying the original description of *Desmonus* (*Cyclodesmus*) *atophus* (Chamberlin and Mulaik), Dr. Carl's notes and illustration of *Cyclodesmus aztecus* Humbert and Saussure, the genotype, were reviewed in Rev. Suisse Zool. **10**: 678-9, pl. 12, fig. 109, 1902. The conclusion was reached that the West Indian species heretofore included under *Cyclodesmus* belong in a different genus for which the name **Caribocyclus** is proposed, with the Haitian *Cyclodesmus angustipes* Loomis as the genotype. This genus is differentiated from the Mexican *Cyclodesmus* by having each gonopod composed of one or two more or less slender branches rising above the basal joint. In the species having 2 branches these may be separated, partially fused, or completely united. The illustration of *C. aztecus* shows the gonopod with an expanded and curved outer joint sheathing the simple and evenly curved seminal one.

Family STYLODESMIDAE

Genus Ilyma Chamberlin

Ilyma Chamberlin, Bull. Univ. Utah **31**(11): 24. 1941.

KEY TO THE SPECIES ILYMA

- Segment 1 with 12 primary tubercles in two transverse series of 6 each
colotlipa Chamberlin
- Segment 1 with 10 primary tubercles arranged essentially in 2 rows.....2

- Segment 1 with outermost primary tubercle on each side larger than any of the others
orizaba Chamberlin
- Segment 1 with outermost primary tubercle on each side not so large as or no larger than the others3
- Segment 19 with posterior processes greatly exceeding the tip of segment 20...*cajuni* Loomis
- Segment 19 with processes shorter, only equaling the tip of segment 20.....4
- Processes of segment 19 broad, the sinus between them rather shallow and U-shaped
morela Chamberlin
- Processes of segment 19 narrow, the sinus between them deep and V-shaped.
digitata n. sp.

A Mexican species, *potosina* Chamberlin, was established on a single fragmentary female, lacking two molts of maturity! Its juvenile characters are not comparable with the mature ones of the other species, and its true identity will be difficult to determine.

Ilyma cajuni Loomis

Three males and 5 females collected by Leslie Hubricht, December 12, 1954, in Cameron County, Tex., at "Rabb Ranch, near southmost (?), under palm logs," and sent me by Richard L. Hoffman.

These specimens were compared with paratypes of *cajuni* without finding specific differences. The species has the primary tubercles of segment 1 arranged as in the following species except that the space between the two median tubercles of both rows is much wider than that between any of the other tubercles.

Ilyma digitata, n. sp.

A male (type) and 4 females, one immature, found beneath logs beside U.S. Highway 190 between Kinder and LeBlanc, La., December 20, 1958.

Diagnosis.—Relationship with *morela* is indicated by the size of the body, the short processes of segment 19, and certain characters of the gonopods, although these differ materially in the two species.

Description.—Length of male and largest female 6 mm, width 0.9 mm. Vertex, first segment, and posterior divisions of other segments black; front of head, antennae, anterior subsegments, segment 20, and all ventral surfaces, including the legs, colorless.

Head with vertex not greatly raised above the front but with 20-28 sharply rounded tubercles

of various sizes, the largest at the lateral margins behind the antennae but the margins not raised into a granular ridge as in *cajuni*.

First segment with only the four large, equidistant, primary tubercles in front forming a distinct row; the other six primary ones also equidistant from each other, one on each side of middle at posterior margin, a second laterocephalad of it and the third still further forward and outward, behind and laterad of the outer tubercle of the front row. In addition there are many smaller tubercles of varying sizes including a dozen or more along the posterior margin, standing erect and not projecting beyond it.

Body with lateral carinae quite narrow, descending more obliquely than in *cajuni*, the pores opening from blunt and cylindrical tubercles as long as thick, not in the least conical. Dorsum of segments with customary 4 rows of primary tubercles extending from segment 2 to 19, the median rows on the latter elevated but not thickened, and produced backward into 2 outwardly parallel processes that equal but do not exceed the tip of segment 20 which is visible in the deep V-shaped sinus between them. Secondary tubercles about 6 in number between the median primary rows but lacking behind segment 16; the 3 secondary ones between the outer and inner primary rows on the anterior four-fifths of body lacking on the posterior fifth. Last segment as in *cajuni*.

Gonopods as shown in Figs 6 and 7.

Family POLYDESMIDAE

Dixiedesmus erasus (Loomis)

Two males and 6 females from east side of Blakely River, Ala., before entering the flats east of Mobile, on U.S. Highway 90, December 19, 1958.

Pseudopolydesmus bidens, n. sp.

Seven males (1 the type) and 5 females from beside U.S. Highway 190, between Kinder and LeBlanc, La., December 20, 1958.

Diagnosis.—A small species, broader and flatter than *minor* (Bollman), with anterior corners of carinae dentate from segment 2 through 18, and with distinctive gonopods.

Description.—Largest specimen of each sex 12 mm long and 1.7 mm wide. Living color dark brown, shining. Dorsum quite flat, the lateral carinae broad, thin vertically at junction with body; anterior corners scarcely rounded and

each with a distinct tooth on segments 2 through 18; lateral margins nearly straight, the poriferous ones with 3 setae plus 1 on the posterior angle, the nonporiferous ones with 2 plus 1 on the angle; posterior angles larger and more produced on all segments, including 19, than in *minor*. Last segment triangular in dorsal view, its sides straight, not slightly emarginate as in *minor*. Gonopods (Fig. 8) with only 2 triangular lobes or teeth on the distomesal edge, the small papillose process located more than halfway to the tip of the gonopod.

Dr. Nell B. Causey kindly sent me a male and female of *P. minor*, collected 1.5 miles west of Conway, Faulkner County, Ark., December 24, 1953, by M. A. Jackson, which allowed me to make direct comparisons with *bidens*. *P. minor* is more slender and convex, with narrower lateral carinae which are relatively thicker where they join the body. Since a complete gonopod of *minor* has not been illustrated previously, one is shown in Fig. 9, in which the small papillose area or tubercle shown a short distance above the basal one is lacking from the opposite gonopod.

Pseudopolydesmus serratus (Say)

Male and many females from beside U.S. Highway 190, at Kinder, La., December 20, 1958.

Family EURYMERODESMIDAE

Eurymerodesmus melacis Chamberlin and Mulaik

Specimens collected in following Texas localities in December 1958: Kerrville-Bandera; Landa Park, New Braunfels; McQueeney; Schertz.

Family STRONGYLOSOMIDAE

Oxidus gracilis (Koch)

Numerous specimens from J. O. Vaughan Ranch, Schertz, and from McQueeney, Tex., December 1958.

Family LYSIOPETALIDAE

Abacion tessellatum creolum (Chamberlin)

Male and female from Ponce de Leon, Holmes County, Fla., December 19, 1958.

Abacion texense (Loomis)

Numerous specimens from Kinder-LeBlanc, La., December 20, 1958; and following Texas lo-

calities, December 1958: J. O. Vaughan Ranch, Schertz; Kerrville-Bandera; McQueeney; Landa Park, New Braunfels.

Family RHISCOSOMIDAE

Tingupa sp.

Two specimens, 4 mm long, with 28 segments each and having essentially black markings collected beside U.S. Highway 190 at Walker, La., December 20, 1958.

Family CLEIDOGONIDAE

Cleidogona sp.

Two females near Blakely River before entering flats east of Mobile, Ala., on U.S. Highway 90, December 19, 1958.

Mecistopus, n. gen.

Type.—*Mecistopus varicornis*, n. sp.

Diagnosis.—Included among genera having ninth male legs 5-jointed but differing in the coxal joint and in having joints 4 and 5 very small. Relationship with *Rhabdarona* Chamberlin and Mulaik is indicated but the gonopods reach back along the body, when at rest, with tips inserted between the separated sterna of legs 12 and 13. Sexual differences of the last joint of the antennae also are unique.

Description.—Body of intermediate size, smooth and strongly shining with the outer dorsal seta on each side of segments 2 to 8-13 borne on a subconic tubercle set off above by a distinct longitudinal impression.

Head with labral area convex and raised above the front; last joint of antennae differing in size and shape in the sexes.

Gonopods unusually long, bent strongly caudad and lying in close contact with each other and with the ventral side of body between the coxae of legs 9 to 12 which have their sterna broadened; tips of gonopods curving up toward body between the well separated sterna of legs 12 and 13, the latter wider than the sterna that follow.

Males with legs 1 and 2 shorter and more slender than legs 3 to 7, which are crassate but have no other special modification except that the ventral face of the last joint of each leg is papillose; ninth legs 5-jointed, basal joint large and apically continued into a long, slender, erect and acute process, joints 4 and 5 very small;

legs 10 and 11 with the poriforation of each coxal joint opening from a cylindrical process behind which, on leg 11, is a conic tubercle; twelfth legs lacking either process or tubercle.

Mecistopus varicornis, n. sp.

Many specimens, including male type, collected in collaboration with J. C. Loomis between Kerrville and Medina, Tex., along Highway 16, December 26, 1958; a male from beside the Beauregard Road, 5 miles SSW. of Boerne, Tex., collected January 31, 1959, by J. C. Loomis; and a male from Landa Park, New Braunfels, Tex., December 29, 1958.

Description.—Length 14 to 17 mm, the males shorter than females. Fully colored living specimens are shining dark chestnut-brown with a very narrow longitudinal median light line, a tiny light spot surrounding base of first dorsal seta, and a larger oval light spot between the two outer setae; the hyaline dorsal setae are conspicuously silvery in daylight on the living animal, giving it a coarsely fuzzy appearance.

Head with broad labral area convexly elevated above the front and with lateral margins behind it also elevated for a considerable distance; front hispid, much more densely so adjacent to the labrum; eyes well developed, triangular, in series of ocelli arranged 7, 6, 5, 4, 3, 2, 1, from above; antennae very long and slender, joint 3 longest, joint 7 differing in both length and shape in the sexes as shown in Figs. 10 and 11.

On segments 2 to 8 or 9 of female and 2 to 10-13 of male the outer seta on each side of dorsum is near the posterior margin and borne on a distinct tubercle, largest in male, which is set off from the surface above it by a conspicuous furrow extending forward halfway across the subsegment.

Anterior gonopods as shown in Fig. 12. Posterior gonopods small, reaching only to about the middle of the coxal joint of ninth legs and consisting of 2 apically thickened structures resembling wooden golf clubs on short shafts with the heads directed outward. Ninth legs 5-jointed, as shown in Fig. 13, the tiny, subhemispherical, fifth joint almost black in contrast to the nearly colorless preceding joints. Legs 10 (Fig. 14) and 11 as in generic description, the anterior face of the broad sternum of each smooth whereas the anterior median face of twelfth sternum has a strong vertical ridge with sterna thereafter having similar but smaller ridges.

Family PARAIULIDAE

Aniulus adelphus Chamberlin

Numerous Texas specimens from J. O. Vaughan Ranch, Schertz; and McQueeney, December 1958.

Aniulus craterus Chamberlin

Many specimens collected along Highway 16 between Kerrville and Bandera, Tex., in collaboration with J. C. Loomis, December 26, 1958.

Aniulus vestigialis, n. sp.

Male (type), female, and several immature females from Landa Park, New Braunfels, Tex., December 29, 1958.

Diagnosis.—Related to *austinensis* Chamberlin but differing from it and all others of the genus in having the accessory blade of posterior gonopods reduced to a vestige near the base of the broad seminiferous blade.

Description.—Male 36 mm long with 58 segments; female 31 mm long with 53 segments; both 2.6 mm in diameter. Living color mostly yellowish brown with a lateral series of dark spots at the pores.

Head with mandibular stipes of male as shown in Fig. 15.

First segment of male about as long as segments 2 and 3 together as measured either along the dorsum or lateral margins; a single strongly raised rim along the broadly emarginate lateral margin. Second segment with two strong lateral ridges, its lateral margin little if any lower than that of segment 1; ensuing segments with more lateral striations but the intervals not raised into ridges. Apex of last segment somewhat surpassing the valves, more acute than a right angle, its sides straight, not emarginate.

Gonopods as shown in Figs. 16–18. Sternum of tenth male legs with a rounded surface swelling on each side and medianly its anterior portion developed into a long vertical ridge projecting between the posterior gonopods.

Ethoiulus oreines (Chamberlin)

Aniulus oreines Chamberlin, Bull. Univ. Utah **30** (11): 6, figs. 18, 19. 1940.

The figures cited above clearly indicate necessity of the transfer.

Ziniulus ambiguus, n. sp.

Two males (1 the type), a female, and three

immature specimens collected along the Beau-regard Road, about 5 miles SSW. of Boerne, Tex., January 31, 1959, by J. C. Loomis.

Diagnosis.—While the anterior gonopods closely resemble those of *Hakiulus*, the posterior ones are more typical of *Ziniulus*, especially *Z. medicolens*, and the mandibular stipes are typical of the latter genus.

Description.—Color dark, approaching black, with minor lighter markings. Type with 48 segments, body 20 mm long, 1.7 mm wide; other specimens with 47 to 51 segments.

Mandibular stipes of male (Fig. 19) subquadrate, with both angles of nearly equal size; dorsal edge with a raised rim.

First segment of male unusually short, the lateral margin but little longer than that of segment 2 (Fig. 19) which may have 1, 2, or 3 lateral striations. Segments with transverse sulcus broadly bowed forward where it passes in front of the pore which is separated from it by about its own diameter. Last segment with apex slightly exceeding the anal valves but not deflexed.

Anterior gonopods (Fig. 20) resembling those of *Hakiulus*, the posterior ones (Figs. 21–23) with the flattened, uncate, blade rising from near the base of the bifurcate blade rather than distad of its middle, as in *medicolens*. Sternum of segment 8 lacking a median projection in front.

Ziniulus medicolens Chamberlin

Numerous specimens of both sexes from J. O. Vaughan Ranch, Schertz, Tex., December 1958.

Family ATOPETHOLIDAE

Eurelus kerrensis Chamberlin and Mulaik

A mature female, thought to be this species, from beside Highway 16, between Kerrville and Bandera, Tex., collected December 26, 1958, in collaboration with J. C. Loomis.

The specimen has 52 segments and is 8 mm in diameter, similar in this respect to *soleatus* Cook, but is larger than is given for *kerrensis*, the smaller size of which was one of the characters on which the two species were separated.

Family SIPHONOPHORIDAE

Siphonophora sp.

A young female, 8 mm long and with but 41 segments, collected by Leslie Hubricht, March 12, 1955, in Zilker Park, Austin, Tex., and sent me by Richard L. Hoffman.